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ABSTRACT

This study sought to determine the difference between learning with the aid of a motion picture presenting the visual field of the performer and the performer in action and learning with the aid of a motion picture presenting only the performer in action. Two motion pictures of a student tracking on a pursuit rotary unit constituted the experimental factors. The first motion picture was taken from the point of view of a spectator; the second motion picture showed both the view of the spectator and the visual field of the person tracking. The subjects were divided into three groups identified as control, experimental spectators, and experimental performers. The control group did not view either of the motion pictures. Subjects in the experimental spectator group were instructed to watch the film of the person tracking and see if they could see anything that would help them to track better. The experimental performer group viewed the motion picture from both the performer field of view and the view of the spectator. Both experimental groups were instructed to employ any technique that they may have seen in the film to improve their own target time. Findings indicated there was no difference in learning under the three different conditions. Two conclusions are drawn from the findings. One concerns the type of skill to be learned. More significant information should be present in the visual field of a gross motor task as opposed to the fine motor task of tracking. The second conclusion concerned the presence or absence of danger in the skill. Skills that require the body to make moves at the recognition of visual cues or risk an injury might benefit from visual field photography as a training tool. (JD)

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# Visual Field Photography as a Teaching Aid

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Simulation, though not new in educational methodology, is becoming increasingly possible and practical as a teaching tool. It is particularly essential when one is learning a motor skill that is inherently dangerous. In addition, it has a great potential for saving time and money (4). We are familiar with air craft simulators and the use of simulation in teaching one to drive the automobile. However, it is quite possible that we as educators are overlooking a very valuable instance where visual simulation can be used to teach motor skills. The ABC Sports television programs are probably most noted for photographing the visual field of the performer so as to give the spectator the illusion of actually being involved in the act of driving an auto on a race track, of sky diving, or of going down a ski slope. Though it has been more than ten years since the first use of such visual field photography in sports television, there has not been a widespread use of this technique in the production of teaching films in sports and physical education. Obviously photographic technology has not advanced to the point where we are capable of capturing a discernable visual field in all types of activities, but Vetter (11) reported motion types "capable of being accurately and realistically reconstructed as motion perspective which is accomplished through camera motion with relations to a fixed field of view and object movement which entail the photographing of the movement of objects within a field-of-view." When used in a setting of physical activity, camera motion would ultimately become performer motion. Despite the acknowledgement of this information, its use is very infrequent. Perhaps these photographic techniques are used rarely, if at all, in the production of teaching

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films because the value of such information has not been shown to be worthy of the time and effort.

The literature related to this topic falls within one of three categories. These are literature dealing with the effect of motion pictures in motor skill learning, the importance of visual stimuli in motor skill learning and the effect of the reproduced visual field in learning a motor skill. Since the first category has been thoroughly researched and it is common knowledge that motion pictures tend to facilitate learning, we will discuss the latter two categories.

The role of vision in learning a motor skill has been the subject of interest to several investigators. Fitts (2) suggested some time ago that early attempts to learn a motor skill are primarily under visual control. A study done by Fleishman and Rich (3) in which they found a two-hand tracking task, visual-spatial orientation significantly related to performance in early stages of learning supports this concept. They feel that individuals with the greater capacity for utilizing visual information make more progress in the early learning period than do those lacking such capacity. The work of Stallings (10), Benson (1), and Monford (9) all suggest that vision is highly significant in learning a motor skill. Stallings (10) examined the relationship between visual-spatial orientation, visualization, and perceptual speed to the performance of specific gross motor skills at successive stages of learning. Benson (1) identified factors related to the execution of a motor skill presumed to require elements of balance, kinesthesis, and unilateral motor patterns. Vision, he points out, can be a factor which affects motor performance. This

study suggests that the role of vision is highly specific to the task to be performed. Monford's (9) study investigated the value of supplementary information during practice on dynamic kinesthetic learning and concluded that little or no improvement can be expected when practice involves kinesthetic error information only. Hoepner's (5) work yielded conclusions that suggest that vision might not be significantly important in motor skill learning. His study made a comparison of motor ability, new motor skill learning, and adjustment to a rearranged visual field. Results indicate that there was no relationship between new motor skill learning and the ability to adjust to a rearranged visual field. These results, however, should not be interpreted as precluding the importance of visual cues in learning a motor skill. Keogh (8) also finds that increased visual cues facilitate learning. The increased information had a significant effect on the learning of the males only. Consequently, these results suggest sexual differences in ability to utilize visual information.

Efforts to reproduce the visual field of the performer so as to provide the learner with visual information, and thus accelerate learning, have been limited. Hoskins (6) developed a response-recognition training film that was to help the student perceive the direction of a tennis return. A similar film was later used as a teaching tool. Johnson (7) used the film as a motor task to be learned by subjects and found that specific and general action potentials correlated significantly with their achievement and the motor task.

It is the purpose of this study to extend these earlier works and determine the significance of the difference in learning with the aid of a motion picture presenting the visual field of the performer and the performer in action, as compared to learning with the aid of a motion picture presenting only the performer in action.

## Method

Subjects. Subjects were 30 male and female students enrolled in physical education and recreation classes at North Carolina Central University during the 1981 summer session. They were all volunteers who met with the experimenter at their convenience. The subjects ranged in age from 18 to 38 years. After the initial test, subjects were randomly assigned to one of three treatment groups, 10 subjects each. None of the subjects had had previous experience with the tracking task.

Visual Cues in Film. Two super 8 motion pictures of a graduate student tracking on the pursuit rotary constituted the experimental factors. The first motion picture was taken from the point-of-view of a spectator, while the second super 8 movie showed both the view of the spectator and the visual field of the person tracking.

The visual field of the person tracking was taken by a camera operator who stood elevated behind the person tracking and shot over the shoulder. A special effort was made to get the camera angle and distance as close to that of the eyes of the person tracking as possible. This shot resulted in an overhead view of the turntable, the stylus, and the hand of the person tracking.

The graduate student selected to be in the training film was trained on the tracking task until an average of 20 seconds or greater was consistently reached for ten thirty-second trials at 60 RPM. The average on-target time during the film was 23.157 seconds. Upon initial viewing of the training film by the experimenter and the graduate student who performed in the film, the graduate student agreed that the film showed what was seen as she tracked.

Apparatus. The pursuit rotary unit used in this study was manufactured by LaFeyette Instrument Co. of LaFayette, Indiana. This model, number 30012, was designed to match specifications set by the United States Air Force School of Aviation. It has four discrete speeds: 15, 30, 45, and 60 RPM. The stylus is spring-loaded and thus prevents target trapping. The unit has two timers that allow for the selection of trial times from 3-60 seconds and rest periods from 0-5 minutes. On target time is measured by a 1/100 second stop-clock.

Procedure. All subjects were pretested to determine their initial skill level in tracking for 30 seconds at 60 RPM. Initial instructions to all subjects were simply "try to keep the stylus in contact with the disc while the table turns." Further instructions informed the subjects that the table would continue turning for 30 seconds and would then stop. The table would remain stopped for 30 seconds, and during this time subjects were instructed to stand relaxed. The average on target time for the ten trials was recorded as the pretest score.

Subjects were randomly assigned to one of three groups, identified as control, experimental spectator, and experimental performer. The control group did not view any of the motion pictures prior to the post test and was given the identical instructions at the time of post test as were given during the pretest. The experimental spectator group viewed the motion picture of a person tracking that showed the spectator view only. At the time of film viewing, the subjects were instructed to watch the person tracking and see if they could see anything that would help them track better. The experimental performer group viewed a motion picture taken with shots of both the performer field of view and view of a spectator. At the time of the film showing, this group was instructed to look for anything that might help them improve their tracking. Prior to the post test, both the experimental spectator group and experimental performer group were instructed to employ any technique that they may have seen in the film to improve their on target time.

Results and Discussion

The motion picture of the performer's field of view had no effect on learning in this situation. Analysis of Covariance was used to analyze the data. The sums of squares, means square, degrees of freedom and calculated F ratio can be found in Table 1.

(Table 1 about here)

Table 1
Summary of Analysis of Covariance Results

| Source | SS Pre | SS Post | SP | SS* | Degrees | MS* Post | F |
|---|---|---|---|---|---|---|---|
| Treatments | 58.74 | 9.18 | 23.22 | 4.97 | 2 | 2.48 | .4542 |
| Error | 716.47 | 491.10 | 500.09 | 142.05 | 26 | 5.46 | |
| Total | 775.21 | 500.28 | 523.31 | 147.02 | | | |

The calculated F ratio (.4542) is less than the 3.37 found in the distribution of F where Alpha = .05 at 2 degrees of freedom. Consequently, there was no reason to believe that there was any difference in learning under the three different conditions.

These findings are contrary to what the literature would seem to suggest. Fitts' (2) very early suggestion that early motor learning is under visual control would seem to indicate that information in the performer's field of view could help in learning. The fact that this information did not make a difference in this study could be attributed to two factors that should be eliminated in the future.

The first factor concerns the type of skill to be learned. It now seems likely that there was not sufficient information in the visual field of the performer to significantly affect the learning of those who watched the visual field film, or subjects were unable to utilize the available information. It is likely that more significant information would be present in the visual field of a gross motor task as opposed to the fine motor task of tracking. Further, it is anticipated that activities requiring either performer motion as in gymnastics or greater object motion as in batting a baseball would produce greater visual cues to be studied in a motion picture.

The second factor concerns the presence or absence of danger in the skill. Skills that require the body to make moves at the recognition of visual cues or risk an injury would probably benefit from visual field photography. In some

situations it would seem that seeing the visual field of a person executing a skill in this category could even lessen the fear associated with learning such skills.

Eliminating the aforementioned problem in future attempts to determine the significance of visual field photography upon learning a motor skill is more difficult than would meet the eye. The big problem is in selecting a noval activity conducive to capturing a discernable visual field on film and being taught to a group.

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